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PSYCHOLOGY.

Prof. Mark Baldwin on Preformation and Epigenesis.

—In the last number of the *NATURALIST* was republished from *Science*, Prof. Baldwin's observations on my presentation of the contrasted hypotheses of the development of mind.¹ One of these theories was supposed to be in accordance with the evolutionary doctrine of preformation, the other was thought to bear the same relation to that of epigenesis. Prof. Baldwin asks why the three theses arranged under epigenesis may not with equal or greater propriety be arranged in the preformation column. He believes that consciousness has had an influence in directing the course of evolution in accordance with the "general law now recognized by Psychologists under the name of Dynamogenesis—*i. e.*, that the thought of a movement tends to discharge motor energy into the channels as near as may be to those necessary for that movement." He also says, "I do not suppose that any naturalist would hold to an injection of energy in any form into the natural processes by consciousness. The psychologists are, as Mr. Cattell remarks, about done with a view like that." Prof. Baldwin also remarks that "Prof. Cope can say whether such a construction is true in his case." He adds that "it is only the physical basis of memory in the brain that has a causal relation to the other organic processes of the animal."

To reply to the last question first. The facts seem to show that conscious states do have "a causal relation to the other organic processes of the animal." I have gone into this subject briefly, but more fully than can be done here, in Chap. X of my book on the "Primary Factors of Organic Evolution" (1896). The evolution of the brain, the organ of consciousness, would indicate this, as well as the evidence for Kinetogenesis or evolution by motion. This would follow, if the doctrine of Dynamogenesis referred to by Prof. Baldwin be true, at the psychic end of the process, and if acquired characters be inherited, as required by the doctrine of epigenesis. If then consciousness has such a function, the question arises as to its immediate mode of action. Prof. Baldwin says "only the physical basis of memory has a causal relation," etc. This proposition I can accept, and it is true whether that physical basis be due to a conscious state called a sense-impression, or not. But the directions of the acts (motions) which flow from that physical basis are very various in organic beings, having adaptations

¹ See *Primary Factors of Organic Evolution*, 1896, p. 14.

to as many ends as there are benefits to be obtained. It is evident that the physical basis of memory undergoes a change from the condition in which it is first produced. Its component parts are evidently rearranged in accordance with some purely psychic factors, *i. e.*, in accordance with qualities and properties which are only appreciable by conscious states. One may suppose that a reflection of the physical basis of a memory may be transmitted to different parts of the cortex, and that in one part it is located in accordance with one criterion of classification, and in another region in accordance with another criterion. In other words, the representative functions of the brain control the structure of the physical basis of memory, or cause a modified reproduction of it. These representative functions may be of the simplest — *i. e.*, they may consist only of criteria of size, color, utility, etc., or they may be more complex, involving judgments, concepts, etc. Finally, no criteria can violate the ultimate "forms of thought," which are essentials of all representative mental action. These, in short, are the fundamental reasons why mental conditions may be believed to direct the course of energy, without increasing the amount of that energy.

The relation of this factor of evolution to the the theories of Preformation and Epigenesis may be now considered. The reason why I believe that the process of mental evolution has been and is at bottom epigenetic, is because there is no way short of supernatural revelation by which mental education can be accomplished other than by contact with the environment through sense-impressions, and by transmission of the results to subsequent generations. The opinion is simply a consistent application to brain tissue of a doctrine supposed to be true of the other organic structures. The injection of consciousness into the process does not alter the case, but adds a factor which necessitates the progressive character of evolution.

I do not perceive how promiscuous variation and natural selection alone can result in progressive psychic evolution, more than in structural evolution, since the former is conditioned by the latter. The objections to this mode of accounting for progressive structural evolution are well known, and are enumerated in my book on page 474. It is true, no doubt, that as we rise in the scale of mental faculty the capacity for acquisition increases. How far these acquisitions are in inheritable is a question of detail, but no one denies, so far as I am aware, excepting consistent preformationists, that they are more or less inheritable. It is to be supposed that the longer special aptitudes are cultivated the more likely they are to be inherited, precisely as the ef-

fects of constant use of an organism are inherited, while sports and mutilations are not inherited. The importance of the social influences among men on which Prof. Baldwin justly lays so much stress, consists in the fact that they are continuous in their operation, and produce permanent habits. This accounts for the phenomena referred to by him when he remarks that "the level of culture in a community seems to be about as fixed a thing as moral qualities are capable of being; much more so than the level of individual endowment. This latter seems to be capricious or variable, while the former moves by a regular movement and with a massive front." Here we have portrayed exactly what occurs in structural evolution. The habitual influence of the environment, internal and external, conditions the steady advance, while sports produce only temporary effects or are effective only in proportion to their ratio to the entire movement.

In an essay published in *Science* of March 20th, 1896, Prof. Baldwin comments on the lectures of Prof. Lloyd Morgan, in support of his own doctrine of Social Heredity. This is the name he has applied to this transmission of habits through their persistence in societies, so that the young acquire them through imitation or instruction, without the intervention of physical heredity. As a foundation for this view he disputes the necessity of any inheritance of acquired habits by the inheritance of the nervous mechanism which they express, and denies therefore that use is a necessary agent in the evolution of such habits. In order to prove that instincts are not "lapsed intelligence" he says; "The intelligence can never by any possibility create a new movement or effect a new combination of movements, if the apparatus of brain, nerve and muscles has not been made ready for the combination which is effected. This point is no longer in dispute," etc. Immediately before this, however, he says. "But let us ask how the intelligence brings about coördinations of muscular movement. The physiologist is obliged to reply; "Only by a process of selection (through pleasure, pain, experience, association, etc.) from certain alternative complex movements, which are already possible for the limb or member used."

It is granted in the last quotation that pleasure, pain and other conscious states, select the motions which become habits. Such selection is intelligent, and such act is an expression of intelligence, though of the simplest sort. All that Prof. Baldwin alleges is that intelligence is impotent to construct the mechanism of new habits out of mechanisms already too far specialized in definite directions to permit such a reorganization of structure. This truth in nowise contradicts

the construction of the mechanism of new habits from tissues capable of reconstruction or of modification, a quality which resides very probably in brain tissue, or at least certainly has resided in it at various stages of organic evolution, when new "selections through pleasure, pain, experience, association, etc.," were made; otherwise the selection would have been impossible. This is the history of all the other tissues, and why not of brain tissue? Though Prof. Baldwin denies the necessity of the Lamarckian Factor, he admits it in this doctrine of selection; and his denial of inheritance, only covers the case of psychological sports, as above pointed out. Hence he both admits and denies both Lamarckian and Weismannism.

Weismannism has recently struck the psychological camp, and in Prof. Baldwin and in Mr. Benjamin Kidd, we see some of its recent effects. But since the biologists have generally repudiated Weismannism, the evolutionary psychologists must try and get along without it. Nevertheless, as above remarked, Prof. Baldwin's "Social Heredity" is a real factor, especially in human evolution; but as it is not heredity, I think it should have a new name, which shall be less confusing.

E. D. COPE.

Psychologic Data Wanted.—For purpose of extended comparison I wish data as to habit, instinct or intelligence in animals, above all, minor and trifling ones not in the books, *useless* or *detrimental* ones, and the particular *breed*, *species* or *genus* showing each. Purring, licking, washing face, kneading objects with fore-paws, humping back, and "worrying" captured prey (like the cat), baying (at moon or otherwise); urination and defecation habits (eating, covering up, etc.); disposition of feces and shells in nest; rolling on carrion; cackling (or other disturbance) after laying; eating "afterbirth" or young; sexual habits; transporting eggs or young; nest-sharing; hunting partnerships or similar intelligent associations; hereditary transmission of peculiarities; rearing young of other species with resulting modification of instinct; feigning death; suicide; "fascination;" are examples. Circular of information will be sent and full credit given for data used, or sender's name will be confidential, as preferred.

Answer as fully as possible, always stating age, sex, place, date (or season), species, breed, and whether personally observed.

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